Applying predictive models for ecological risk management during bio-remediation

M. Van Gestel[1], A. Aarts[2], J. Bonroy[1], P. Seuntjens[1,3]

[1]Ghent University, Department of Soil Management, Coupure Links 653, 9000 Ghent Belgium

[2]Universoil, Louis Jasminlaan 56, 1150 Brussels, Belgium

[3]VITO, Flemish Institute for Technological Research, Environmental Modeling Unit, Boeretang 200, 2400 Mol, Belgium

To satisfy both economical and ecological interests, soil remediation projects increasingly shift towards remediation techniques within a risk management approach. For soil venting solutions, this approach is only accepted by the regulator when the remediator can guarantee that no emissions occur during the remediation process. Intensive monitoring results in the possibility of adjusting the remediation process more precisely to avoid emission. When carefully designed, the need for expensive off gas treatment can be limited, further reducing the ecological impact and the operational cost of the remediation technique. The presented monitoring and feedback technique uses predictive models combined with continuously measured data from volatile organic compounds (VOC) sensors to provide an automated adjustment of the remediation process.

The predictive model uses soil and contaminant parameters together with measured VOC data. The input data consist of partial breakthrough curves at different soil depths. New measurements will be used to update the input data in order to keep the model as accurate as possible. The presented results from column tests demonstrate that the model is able to predict the moment a given contaminant concentration will be reached near the surface. In case a threshold will be exceeded in the future, the applied soil remediation technique can be adjusted timely to alleviate the predicted contaminant concentration.